Semantic 'blocking' effects of functional categories in Japanese EFL learners' interlanguage grammars

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ABSTRACT

Recent research addressing the extent to which adult L2 learners have access to Universal Grammar (UG) has focussed on formal features of functional categories which are not activated in the L1. This study continues this line of enquiry by investigating whether Japanese speakers can acquire a formal feature which drives relative-operator movement in English relative clauses, but is not instantiated in Japanese, with respect to the following two principles of UG: (a) a 'Generalised Blocking Principle' (Takeda, 1999) for the applicability of semantic operations to calculate the meaning of relative clauses, and (b) a 'Subjacency' principle for the diagnosis for wh-movement involved in relative clause formation. To test whether Japanese speakers can acquire the formal feature [ + R] in English relative clauses, and hence are sensitive to the Generalised Blocking Principle and the Subjacency effects, a grammaticality judgement task with a five-point scale was administered to five different proficiency levels of adult Japanese speakers, as well as to English native controls. This test had a set of grammatical and ungrammatical relative clauses violating Subjacency. The results showed that not only less proficient learners but also advanced learners failed to reject some types of relative clauses violating the Subjacency conditions. However, this does not mean that even advanced learners still have trouble acquiring the formal feature which blocks the free application of semantic operations in English. We suggest that where a feature inducing a blocking effect is absent in the L1, it may not necessarily continue to be absent in the L2.

KEY WORDS

L2 acquisition relative clauses semantic operation
wh-movement Subjacency Generalised Blocking Principle

1. Introduction

A continuing debate in second language (L2) acquisition research is the extent to which 'adult' L2 speakers have access to Universal Grammar (UG). Recent research addressing this matter has focussed on accessibility of formal features of functional categories which are not activated in the first language (L1). It has been reported that differences are found in some grammatical properties between advanced L2 speakers and native speakers, even in end-state

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L2 grammars.

There are, at least, two distinct approaches to these differences: (a) L2 speakers have syntactic representations with full feature specifications, but they have a superficial mapping problem between syntactic representations and morphophonology (Lardiere, 1998a, 1998b, 2000; Prévost and White, 2000; among others); (b) L2 speakers' syntactic representations are underlyingly different from native speakers due to the absence of parametrised formal features which are not instantiated in the L1 (Hawkins and Chan, 1997; Franceschina, 2001; among others).

This study continues this line of enquiry and reports on preliminary results of the experimental study which investigates whether or not 'adult' native speakers of Japanese can acquire a formal feature which drives relative-operator movement in English relative clauses where that feature is not represented in Japanese. In particular, this study is carried out with respect to the following two principles of UG: (a) a 'Generalised Blocking Principle' (Takeda, 1999) for the applicability of semantic operations to calculate the meaning of relative clauses, and (b) a 'Subjacency' principle for the diagnosis for wh-movement involved in the relative clause formation. Whether or not to follow both principles will provide us with evidence for the acquisition of feature-driven wh-movement in English relative clauses by Japanese speakers.

2. Assumptions about the representation of relative clauses

Within the Minimalist framework (Chomsky, 1995, 1998), Takeda (1999) has proposed that English relative clauses have the feature [+R] in C, which needs to be checked off against the relative pronoun/operator with a feature [+R], and therefore drives relative-operator movement in the overt component, as in (1a). If the relative pronoun stays in situ, the resulting structure is ruled out as ungrammatical, as in (1b).

(1)  a. [DP the [NP book [CP which, [IP John bought it]]]]
     b. 'the book [John bought which]

In Japanese, however, there is an adjunct/predication type relation with no operator, and no feature-driven movement is required due to the lack of a functional category C and the relative operator with the feature [+R], as in (2) (Takeda, 1999). Hence, relative clauses in Japanese are formed restrictedly by the base-generation strategy, with the surface gap in the relative clauses occupied by small pro.

(2)  [NP [IP John-ga pro katta] hon]
     John-NOM bought book

"a/the book which John bought"

In this study, following Heim and Kratzer (1998) and Takeda (1999), we assume that the
syntactic component and the semantic component consist of autonomous systems, and the output of the syntactic derivation is supplied as the input to the semantic interpretation. Syntactic categories of the terminal nodes of phrase structures generated in the syntactic component are translated into semantic types, and the semantic computation is conducted compositionally in a bottom-up manner (e.g., Klein and Sag, 1985; Takeda, 1999). This process should be type-driven. We also assume that the semantic component of the language faculty is universal (Chomsky, 1998) and the operations in the semantic component show no parametric variation across languages because, as is the nature of Logical Form (LF) where the operations applied are universal and cannot be parametrised, the parametric differences of covert operations are not learnable due to their invisibility (Takeda, 1999). Takeda (1999) proposes that the applicability of semantic operations can vary depending upon features of lexical items in the lexicon manipulated by the overt component (i.e., syntax): essentially the features of functional categories. She links the features of a functional category in English to a semantically-relevant ‘Generalised Blocking Principle’ (GBP), which is universally available, as in (3). This is based on Chierchia’s (1998) idea that syntactically-related features have the effect of constraining the free application of semantic operations.

(3) Generalised Blocking Principle (Takeda, 1999: 103)

If a language has a certain functional category in its lexicon, the free application of the semantic operation that has the same function as that syntactic category has is blocked in that language.

Taking a ‘functional category’ here to mean a ‘feature of a functional category’, what the GBP suggests is as follows. English and Japanese differ significantly in the way they calculate the meaning of relative clauses. In English, the presence of the formal feature [+ R] in C blocks the free application of a semantic operation, hence relativisation primarily resorts to a movement strategy. A relative pronoun/operator is a prerequisite for activating a relative clause interpretation. By contrast, since there is no formal feature [+R] in C in Japanese, the GBP does not prohibit the free application of a semantic operation, and relative clause interpretation can apply freely to ‘nominal + clause’ complement constructions.

Given this principle, we are able to rule out the possibility that the hypothetical relative clause with no relative pronoun/operator but with a resumptive pronoun in (4) in English gets interpreted by applying a semantic operation (Takeda, 1999).

(4) a. ‘the book [θ (C) [♂ John bought it]]
   b. ‘the book [which [♂ John bought it]]

According to Takeda (1999), if application of a semantic operation is freely allowed in English, the semantic type of the relative clause (IP) in (4a) would be changed into a property of a certain type and should be combined with the relative head noun without giving
rise to type-mismatch. But (4a) is not grammatical, which indicates that the semantic operation to obtain a predicate out of the relative clause is not available in English because of the blocking effects, and hence relativisation in English always requires a relative pronoun/operator which triggers the blocking effects. Even if there are both a relative pronoun/operator and a resumptive pronoun, a sentence like (4b) is ungrammatical. This suggests that a relative pronoun/operator should be indispensable, but resumptive pronouns should be removed.

In contrast to English, Japanese lacks a functional category C (and the formal feature \([+R]\) associated with it), which is supposed to license a relative operator that would induce a semantic operation in the semantic component. Due to the absence of the syntactic relative operator, the principle in (3) applies to produce no effect on the availability of a semantic operation in Japanese, and as a consequence, the application of a semantic operation is allowed in a fairly free manner in Japanese. The availability of a semantic operation without any syntactic constraint leads to a prediction that relativisation is possible as long as there is a small \(pro\) over which a semantic operation applies. This prediction could explain the lack of island effects in Japanese well (Takeda, 1999).

\[(5) \[\_p\] John-ga \[\_p\] \([\_p pro pro katta]\) hito-ni aitagatteiru] hon-ga koko-ni aru\]

John-NOM bought person-to want-to-meet book-NOM here be

Lit. ‘The book [John wants to meet the person who bought it] is here.’

Take, for example, a sentence like (5). When the relative clause is combined with the head noun, a semantic operation applies over the small \(pro\) in the object position in the relative clause domain. Since this operation is not sensitive to the island, we can convert a proposition to a predicate without any problem. Hence, we predict the lack of island effects with relativisation in Japanese (Takeda, 1999).

3. The Study

3.1. Predictions

Concerning the interpretation of relative clauses in English by native speakers of Japanese, there are two possible predictions which are based on the theoretical background mentioned in the previous section:

(6) Prediction 1

If (adult) Japanese speakers of L2 English, for example, very high proficiency speakers, still have difficulties acquiring functional features but they can acquire the surface morphological properties of relative clauses, the GBP does not work and, accordingly, they freely apply semantic operations to the syntactic representation and are not sensitive to Subjacency violations. Moreover, they will incorrectly accept the
ungrammatical relative clauses with resumptive pronouns because they can calculate the meaning of relative clause constructions without blocking free application of semantic operations.

(7) Prediction 2
If (adult) Japanese speakers of L2 English can acquire a functional category C and its associated formal feature \([+R]\) in relative clause constructions, the free application of semantic operations to compute their meanings is blocked because of the GBP, and they build the relative clause constructions by movement strategy because there is a feature which blocks a semantic operation. As a result, they will correctly reject the ungrammatical relative clauses violating Subjacency conditions and those including resumptive pronouns.

3.2. Participants
Participants in this experiment were 287 adult native speakers of Japanese, who lived in Japan or the UK at the time of the experiment, and 16 native speakers of English randomly selected as a control group. They were divided into five proficiency groups (Elementary, Pre-intermediate, Intermediate, Post-intermediate and Advanced) on the basis of their performances on an independent measure of proficiency: the Oxford Placement Test (OPT) (Allan, 1992). This test involves a multiple-choice auditory discrimination component and two multiple-choice decision components dealing with various types of lexical, morphological and syntactic properties of English (each with 100 items, hence the maximum total possible score is 200). The OPT has been extensively validated against other tests.

The age that participants started learning English was above 10, and the age range was 18 to 47 at the time of the experiment. Hence, participants' backgrounds varied with the quantity and quality of exposure to English that they had (in classrooms and natural environments). Details of the number of participants, the average age, and the scores on the OPT in each group are summarised in Table 1. A one-way ANOVA showed that there was a statistically significant difference among the five proficiency groups of native speakers of Japanese \((F(4, 282) = 1046.123, p<.001)\).

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Age</th>
<th>Oxford Placement Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Range</td>
</tr>
<tr>
<td>Elementary</td>
<td>104</td>
<td>19.11</td>
<td>105-119</td>
</tr>
<tr>
<td>Pre-intermediate</td>
<td>96</td>
<td>19.63</td>
<td>120-134</td>
</tr>
<tr>
<td>Intermediate</td>
<td>46</td>
<td>21.61</td>
<td>135-149</td>
</tr>
<tr>
<td>Post-intermediate</td>
<td>33</td>
<td>25.67</td>
<td>150-169</td>
</tr>
<tr>
<td>Advanced</td>
<td>8</td>
<td>29.50</td>
<td>170-200</td>
</tr>
<tr>
<td>Native control</td>
<td>16</td>
<td>26.88</td>
<td></td>
</tr>
</tbody>
</table>
3.3. Test instrument

The test instrument was a written grammaticality judgement test with a set of items. The participants were asked to read sentences and rate their grammaticality on the five-point scale indicated. The sentences fell into the following three groups, as in (8) to (10) (with 10 subgroups).

(8) The sentences involving the following three types of grammatical relative clauses:
   (a) Relative clauses with a who-operator (8 items)
       The boy who(m) I kicked yesterday broke the window. (-2 -1 0 +1 +2)
       The girl for whom I have bought a computer is my sister. (-2 -1 0 +1 +2)
   (b) Relative clauses with a complementiser that (5 items)
       The young lady that I employed last month works hard. (-2 -1 0 +1 +2)
       The picture that you are looking at was painted by Picasso. (-2 -1 0 +1 +2)
   (c) Relative clauses with a null operator or null complementiser (4 items)
       The friend they lent money to bought a very big house. (-2 -1 0 +1 +2)
       The magazine we got the information from is useful. (-2 -1 0 +1 +2)

(9) The sentences involving the following two types of ungrammatical relative clauses:
   (d) Relative clauses with a doubly-filled comp (who(m)/which that) (5 items)
       *The woman who that is singing on the stage is my wife. (-2 -1 0 +1 +2)
       *The mirror which that Judy broke was very expensive. (-2 -1 0 +1 +2)
   (e) Relative clauses with a resumptive pronoun (5 items)
       *The classmate that you don’t like him is very unkind. (-2 -1 0 +1 +2)
       *The student that I lent the book to her studied hard. (-2 -1 0 +1 +2)

(10) The sentences violating Subjacency conditions in the following five construction types (2 items for each type) (with 2 grammatical declarative sentences excluding extraction out of a relative clause):
    (f) Relative clauses with an extraction from a relative clause
       *This is the bicycle which the police caught the man who stole. (-2 -1 0 +1 +2)
    (g) Relative clauses with an extraction from a sentential subject
       To discover that Frank has cancer was no surprise to his father. (-2 -1 0 +1 +2)
       *This is the ghost which a picture of frightened the children. (-2 -1 0 +1 +2)
    (h) Relative clauses with an extraction from an adjunct
       Many housed were damaged by the storm while I visited England. (-2 -1 0 +1 +2)
       *This is the homework which Lucy went to school without doing. (-2 -1 0 +1 +2)
(i) Relative clauses with an extraction from an embedded question (wh-island)
William asked me who had caused the car accident. (-2 -1 0 +1 +2)
*This is the CD which Peter knows where Tom bought. (-2 -1 0 +1 +2)
(j) Relative clauses with an extraction from a complex NP
Peter heard the news that his best friend would get married. (-2 -1 0 +1 +2)
*This is the house which we heard the news that Dick bought. (-2 -1 0 +1 +2)

There were 71 items in the test, 45 of which were relevant to the present study. Test items were randomised, and there were three test versions where the test items were differently presented. The participants were asked to judge the grammaticality of each sentence by circling one of the numbers on the scale. They were told that +2 meant that the sentence was 'completely possible', -2 meant that it was 'completely impossible', and -1, 0 and +1 were gradations used if they thought the sentence was more or less possible. Detailed instructions were given on the use of the scale before the testing, and there were initial practice items for information before the test began. They had just ten seconds to judge each sentence.

Individuals' scores for each sentence were summed and the means calculated. In the process of the analysis, I measured the distance of learners' judgements from the correct answers and converted their judgements to points (0 to 4). For example, if a learner judged a grammatical sentence as ‘2’, s/he was given 4 points, and if s/he judged it as ‘-2’, s/he was given no points. Comparisons were made between Japanese L2 speaker and native speaker responses using a one-way ANOVA (with Tukey's HSD).

4. Results and discussion

Overall results of the grammatical relative clauses (i.e., wh-operator, complementiser that and null operator or complementiser) and the ungrammatical relative clauses (i.e., doubly-filled complementiser (who(m) that or which that) and resumptive pronoun) are presented in Table 2 and Figure 1, which compare the mean scores for six experimental groups. In both grammatical and ungrammatical relative clause cases, participants' mean scores should approach 4 (maximum score) if they judge correctly, and their mean scores should approach 0 (minimum score) if they judge incorrectly. Significant differences between Japanese and native speakers' responses on the basis of one-way ANOVAs (where rating of grammaticality is the dependent variable and participants' L2 proficiency level is the independent variable) are indicated by an asterisk.

Table 3 and Figure 2 compare the mean scores for each group in judging the ungrammaticality of relative clause constructions violating the Subjacency conditions in five types of extraction (i.e., an extraction out of a relative clause, a sentential subject, an adjunct, an embedded question and a complex NP). Table 4 compares the mean scores for each group in judging the grammatical counterparts of the Subjacency violations.
Table 2. Mean scores of correct responses of grammatical and ungrammatical relative clauses

<table>
<thead>
<tr>
<th>Group</th>
<th>Wh-operator</th>
<th>That</th>
<th>Null</th>
<th>Doubly-filled</th>
<th>Resumptive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>1.980*</td>
<td>2.254*</td>
<td>1.988*</td>
<td>2.402*</td>
<td>1.875*</td>
</tr>
<tr>
<td>Pre-intermediate</td>
<td>2.316*</td>
<td>2.377*</td>
<td>2.247*</td>
<td>2.625*</td>
<td>2.019*</td>
</tr>
<tr>
<td>Intermediate</td>
<td>2.821*</td>
<td>2.570*</td>
<td>2.424*</td>
<td>2.765*</td>
<td>2.852*</td>
</tr>
<tr>
<td>Post-intermediate</td>
<td>3.557</td>
<td>3.048</td>
<td>2.758</td>
<td>3.382</td>
<td>3.406</td>
</tr>
<tr>
<td>Advanced</td>
<td>3.594</td>
<td>2.950</td>
<td>2.656</td>
<td>2.800</td>
<td>3.550</td>
</tr>
<tr>
<td>Native</td>
<td>3.648</td>
<td>3.575</td>
<td>3.422</td>
<td>3.525</td>
<td>3.538</td>
</tr>
</tbody>
</table>

*=significantly different from NS (p<.05)

Figure 1. Results of Grammatical and Ungrammatical Relative Clauses

Table 3. Mean scores of correct responses of Subjacency violations

<table>
<thead>
<tr>
<th>Group</th>
<th>Relative</th>
<th>Sentential</th>
<th>Adjunct</th>
<th>Wh-island</th>
<th>Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>1.827*</td>
<td>1.697*</td>
<td>1.327*</td>
<td>1.601*</td>
<td>1.683*</td>
</tr>
<tr>
<td>Pre-intermediate</td>
<td>1.958*</td>
<td>2.135*</td>
<td>1.568*</td>
<td>1.505*</td>
<td>1.651*</td>
</tr>
<tr>
<td>Intermediate</td>
<td>2.554*</td>
<td>2.837*</td>
<td>2.196*</td>
<td>1.489*</td>
<td>2.283*</td>
</tr>
<tr>
<td>Post-intermediate</td>
<td>2.909</td>
<td>3.091</td>
<td>2.591</td>
<td>1.621*</td>
<td>2.379*</td>
</tr>
<tr>
<td>Advanced</td>
<td>3.375</td>
<td>3.313*</td>
<td>2.063</td>
<td>1.625*</td>
<td>2.438*</td>
</tr>
<tr>
<td>Native</td>
<td>3.844</td>
<td>3.219*</td>
<td>3.063</td>
<td>3.813</td>
<td>3.652</td>
</tr>
</tbody>
</table>

*=significantly different from NS (p<.05)
Figure 2. Results of Subjacency Violations

Table 4. Mean scores of correct responses of grammatical sentences

<table>
<thead>
<tr>
<th>Group</th>
<th>Sentential</th>
<th>Adjunct</th>
<th>Wh-island</th>
<th>Complex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary</td>
<td>1.788*</td>
<td>3.106</td>
<td>2.543*</td>
<td>2.841*</td>
</tr>
<tr>
<td>Pre-intermediate</td>
<td>2.057*</td>
<td>3.339</td>
<td>2.474*</td>
<td>3.000*</td>
</tr>
<tr>
<td>Intermediate</td>
<td>2.109*</td>
<td>3.109</td>
<td>2.880*</td>
<td>3.174</td>
</tr>
<tr>
<td>Post-intermediate</td>
<td>2.515</td>
<td>3.591</td>
<td>3.652</td>
<td>3.394</td>
</tr>
<tr>
<td>Advanced</td>
<td>3.125</td>
<td>3.313</td>
<td>3.313</td>
<td>3.250</td>
</tr>
<tr>
<td>Native</td>
<td>3.031</td>
<td>3.375</td>
<td>3.750</td>
<td>3.813</td>
</tr>
</tbody>
</table>

* = significantly different from NS \( p<.05 \)

The results suggest the following.

(11) The Japanese speakers who have reached, at least, the post-intermediate proficiency level perform within the range of native speakers of English in rating the surface morphological properties of relative clauses (Table 2 and Figure 1).

(12) In the case of the sentences violating the Subjacency conditions in English, post-intermediate and advanced Japanese speakers perform within the range of native speakers of English in judging extraction out of a relative clause, a sentential subject, and an adjunct island. However, no statistically significant difference is found in an extraction out of an embedded question (i.e., wh-island) and a complex NP between the Japanese speakers and native speakers (Table 3 and Figure 2).

(13) In the case of grammatical counterparts of the Subjacency violations, both the post-intermediate and advanced speakers perform within the range of native speakers in all the construction types.
On the basis of their judgements of the grammaticality and ungrammaticality of sentences involving long-distance operator movement, it seems that 'post-intermediate' and 'advanced' Japanese learners of English have acquired feature-driven movement, which supports Prediction 2. They have acquired a feature [+R] as well as functional category C in order to construct the relative clauses in English. Their accurate interpretations of English relative clauses increased in accordance with development in overall English proficiency, and when their overall English proficiency develops to the post-intermediate level, they seem to have the same underlying representation as native speakers of English in constructing relative clauses even if they do not have a feature [+ R] in their L1, i.e., Japanese. This is against the 'representational deficit hypothesis' proposed by Hawkins (2003).

The participants still have problems, however, judging the ungrammaticality of two types of extractions: extractions of a relative clause operator from an embedded question and a complex NP. How might we account for this?

A failure in judging an embedded question (i.e., wh-island) correctly does not mean that even advanced speakers still have trouble acquiring the formal feature which blocks the free application of semantic operations in English. According to the Barrier framework of Chomsky (1986), wh-islands and complex NPs provide weak island effects, and therefore, the sentences with extractions out of wh-islands and complex NPs are mildly ungrammatical. Consequently, this mild ungrammaticality with the Subjacency violations might affect L2 speakers' judgement and block the GBP and then post-intermediate and advanced L2 speakers apply semantic operations to these sentences and judged them as grammatical. This failure to reach native-like judgement is not due to a syntactic representational deficit, but due to defective mapping between the syntactic component and the semantic component. But it needs further consideration to elucidate on what basis they construe these sentences.

5. Conclusion

This study shows that L2 speakers have no difficulty recognizing the semantic relevance of syntactic features of C where such features are different in the L1. This implies that in L2 acquisition there is no critical period for using parametrised features in assembling lexical items which belong to functional categories like C. This view is against the representational deficit hypothesis (Hawkins, 2003). The differences between non-native speakers and native speakers are due to the problem at the interface between the syntactic computational component and the semantic component.

Note

1. Regarding reliability of the grammaticality judgement test used in this study, Cronbach's alpha was 0.824, which means this test is fairly reliable.
Acknowledgments

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References